News Letter 6

Improve Photovoltaic Efficiency
Sun Trackers and their Applications
Kipp & Zonen Sensors keep Grass in Condition

KIPP & ZONEN
SINCE 1830

Content

October 2008

Contact

If you have a news item for the news letter or want to share your experiences with Kipp & Zonen applications and contribute to our next issues, please e-mail the editor: kelly.dalu@kippzonen.com

Reviewing first half-year

The summer holiday season is now over and I hope that everybody has enjoyed her or his holiday. However, for Kipp & Zonen the summer is not a quiet period! It means evaluation of the first half year, preparation for the last quarter, and attending conferences and scientific meetings.

Important for Kipp & Zonen were the Quadrennial Ozone Symposium (QOS) in Tromsø, Norway and the quadrennial International Radiation Symposium (IRS 2008) organised by the International Radiation Commission in Iguasu, Brasilia. In both meetings Kipp & Zonen plays an important role and we were one of the sponsors of IRS 2008.

Our instruments are frequently used for studies of which the results are made public in oral or poster presentations. For our marketing staff these meetings provide ideal opportunities to talk to our end users. We hear about our instruments' performance and quality and special applications, such as the performance of a pyranometer at -80 °C. Also we learn about difficulties and receive suggestions, which are often the initiative for improvements, or even a new product development.

Reviewing the first half-year results a significant trend in our business can be recognised; steady solid growth in the market of solar energy. We now see a break-through in the usage of Kipp & Zonen products in operational applications. Initially our instruments were applied in the R&D phase of developing the technology, and for radiation budget studies. Now our equipment is being installed for performance studies of solar 'farms'. This clearly shows our leadership in the market of solar radiation instrumentation.

During the last quarter of 2008 you can meet Kipp & Zonen people at the European Meteorological Society Annual Meeting (EMS 2008) in Amsterdam and the Meteorex/TECO meeting, organised by the World Meteorological Organisation in St Petersburg. During the EMS meeting Kipp will organise a workshop on solar radiation and the application of our sensors. You can find more information on the meetings in the following pages.

I trust that you will enjoy reading this autumn edition full of practical information and insights into our company ■

Yours sincerely,

Ben Dieterink, President
Kipp & Zonen BV

Meet our New Distributor for Nigeria

We are pleased to announce the appointment of Alifig International Ltd as the exclusive Kipp & Zonen distributor for Nigeria. The President of Alifig, Mr. Alfred Iguh recently visited us in Delft to sign the agreement.

Nigeria is investing in hydrology, agriculture and solar energy. Alifig is well placed to take advantage of the market opportunities that this presents and has already sold a number of instruments ■

Alifig International Ltd.
22 Salawu Street,
Surulere,
Lagos
NIGERIA

contact: Mr. Alfred Iguh
T: +234-1-741-5878
alfrediguh@hotmail.com

Mr. Alfred Iguh

EMS Meeting in the Netherlands

This year the 8th EMS Meeting is held in our home country, the Netherlands. It is the annual event of the European Meteorological Society that provides a platform for discussions on the science of meteorology.

As the market leader, Kipp & Zonen is organising a seminar on solar radiation measurement on the last day of the meeting, Friday 3 October. Our R&D Manager Dr. Joop Mes will give an introduction to the basic elements of solar radiation and its measurement and progress to the role of the sun and the Earth's energy balance in meteorology and climatology.

Naturally, we also have a stand in the exhibition hall with our new Pyrheliometer on display. The eagerly-awaited CHP 1 is ready for the public with an innovative design, enhanced performance and improved functionality. CHP 1 will be shown as a system with our recently introduced SOLYS 2 sun tracker and LOGBOX SD data logger ■

24th International Laser Radar Conference

From June 21st to 27th Kipp & Zonen and Raymetrics participated in the 24th International Laser radar Conference, held in Boulder Colorado. During this bi-annual conference over 300 Lidar scientists meet to discuss the most recent developments in Lidar observation techniques and technology.

Topics of the conference included advances in Lidar techniques and new methodologies, cloud microphysics and radiative properties, atmospheric boundary layer structure and dynamics, and more. Our exhibition booth featured a scanning Lidar system for full 3D atmospheric aerosol profiling. This compact, eye safe system integrates Lidar technology by Raymetrics with the Kipp & Zonen 2AP two axis positioner.

Kipp & Zonen and our Lidar partner Raymetrics actively participate in the Lidar scientific community to ensure that our Lidar systems feature the latest scientific insights and developments. For more information please contact Martin Veenstra at lidar@kippzonen.com ■

Look out for our Stand in a Fresh New Design!

Changing to the new corporate identity, has led to a complete redesign of our exhibition stand. The new strong design can be admired at coming fairs, such as the EMS in Amsterdam.

If you can not make it to any of the fairs, feel free to have a look at our new website www.kippzonen.com. Designed for you to have all the information within reach, easy to find and with relevant downloads and links ■

PASSION FOR PRECISION

Monitoring Solar Radiation to improve Photovoltaic Efficiency

The limited supply and rising prices of traditional energy sources, together with the increasing awareness of climate change and 'Carbon Footprint' costs, have resulted in rapid development of alternative energy sources, in particular solar and wind energy.

Photovoltaic (PV) is the field of technology and research related to the application of Photovoltaic Cells to convert sunlight directly into electricity. The cost of solar cells, panels and arrays is still rather high, so research into new materials and improvement of efficiency continues. Monitoring the solar radiation plays an important role in analysing both the efficiency of the cells and evaluating optimal locations for 'solar farms'.

Existing meteorological stations are often too far away, so measurement in-situ of the available radiation allows a better understanding of the local (micro) climate. Based on these figures decisions on funding and investment are made for projected renewable power plants.

PV panels are specified under Standard Test Conditions (STC). These conditions are 1000 W/m² of solar radiation, 25 °C, Air Mass 1.5 and no wind. Because these conditions are far from the real world, additional measurements are required to show the PV panel's typical performance. Both pyranometers and reference PV cells are used to measure the radiation. Because pyranometers have standard characteristics they can be used to independently compare all types of PV cells.

When the pyranometer is mounted at the same angle as the PV panel it can be used to calculate the panel's efficiency. Furthermore it can indicate failing panels or cells by a sudden drop of efficiency, whilst a gradual decline of efficiency will indicate the need for cleaning the panels. Kipp & Zonen CMP pyranometers provide accurate and reliable measurements for PV monitoring.

Pyranometers are also used for checking PV panels and cells under laboratory conditions. Because CMP pyranometers are specified up to 80 °C (or 150 °C for the CM 4) they can monitor the output of the high energy lamps used in solar simulators.

For thermal energy solar concentrators, and sun tracking PV systems, the direct component of the solar radiation is also required. The CHP 1 Pyrheliometer together with a Sun Tracker measures the direct radiation. Sun tracker systems measuring global, direct and diffuse radiation are often used in PV monitoring and research.

Testing of Photovoltaic devices and reference cells using pyranometers is described in IEC 60904, IEC 61215 and IEC 61646 standards. Characterization and calibration of pyranometers is based on ISO 9060 and ISO 9847

SOLAR ENERGY APPLICATIONS

- Solar prospecting for optimum locations
- Radiation check for PV materials research
- Radiation check for thermal systems research
- PV and thermal power plant efficiency check
- Specification and quality testing of PV panels
- Determination of losses in PV and Reference cells
- Tests according to IEC 60904 standards
- Independent comparison of PV panels
- Solar simulator radiation verification

Sun Trackers and their Applications

Solar radiation is normally measured using a pyranometer that sees the whole hemisphere above it, the 'global' solar radiation. However, it is often necessary to accurately measure the 'direct' radiation coming only from the sun. This is done by a pyrheliometer that has a view slightly larger than the sun and its aureole and does not see the rest of the sky.

Sun Tracker 2 AP in Spain

To make accurate measurements the pyrheliometer must point precisely at the sun and this is achieved using an automatic two-axis sun tracker. An optional shading assembly can be fitted to block the direct solar radiation from reaching a second pyranometer, mounted on the tracker so that the 'diffuse' radiation from the sky can be measured.

The sun tracker follows the solar arc using stepping motors, controlled by a micro-processor, that drive through belts or gears to provide horizontal (azimuth) and vertical (zenith) movement. An on-board programme requires accurate longitude, latitude, altitude, date, and time information for the measurement site. It then calculates the current sun position and points the tracker towards it.

A sun tracker with pyrheliometer, pyranometer and shaded pyranometer makes a high quality solar monitoring station measuring direct, global and diffuse radiation. Such stations are widely used in meteorological networks providing data to weather forecasting models and for climate studies. The highest quality is the Baseline Surface Radiation Network (BSRN). Other applications include atmospheric chemistry research, pollution forecasting and materials testing.

With increasing interest in renewable energy, good quality solar radiation data is becoming increasingly important. For electricity production (photo-voltaic systems) and thermal energy (solar collectors) the direct component is of particular interest. Activities include research and development, quality control, determination of optimal locations, monitoring installed systems and predicting the output under various sky conditions.

The new Kipp & Zonen SOLYS 2 Sun Tracker is proving to be a major success and we are increasing production to keep up with demand. It is the only fully automatic sun tracker that does not require a computer and software for installation. The integrated GPS receiver automatically configures location and time data.

SOLYS 2 is cost effective and simple to use whilst meeting the requirements of the BSRN. It is very efficient, ideal for operation at remote locations using solar power, and the belt drive system requires no maintenance.

The Kipp & Zonen 2AP Sun Tracker has been in production for many years and over 400 units are in use around the world as the basis of top quality solar monitoring stations. The high power motors and precision gear drives have the torque to break ice and to operate in high winds, enabling operation in extreme conditions, from deserts to Antarctica.

A unique feature of the 2AP is the positioning capability. When connected to a PC it can perform a sequence of pre-programmed movements to point at a series of targets.

Whatever your sun tracking need, Kipp & Zonen can provide the solution ■

Kipp & Zonen Sensors help to keep Soccer Stadium Grass in Optimum Condition

Professional soccer is a major business and every aspect is constantly monitored and analysed for improvement, including the quality of the grass. The pitch suffers degrading effects from practice, matches and weather conditions. To recover quickly and maintain a high level of quality throughout the long competition season, the grass growth needs to be sufficient all year round.

Grass Analyser portable stand.

In 2002 Grow® of the Netherlands introduced a Grass Analyser designed to help the stadium staff monitor the condition of the pitch. The Analyser contains several sensors in different locations; on top of the stadium, just above the grass and in the soil.

The soil moisture and temperature sensor is buried 15 cm under the ground, just below the roots of the grass. This measures the root activity and the available water around the root system, over a length of 3 metres. The portable part of the Grass Analyser stands on the pitch and contains a Kipp & Zonen PAR Lite, together with temperature and relative humidity sensors. Another PAR Lite is placed on the roof of the stadium.

PAR Lite measures the Photosynthetically Active Radiation (PAR) that plants use to grow. The output is calibrated in µmol/m².s of natural daylight in outdoor conditions. PAR Lite uses a specially designed optical filter to give the same response as plants to visible light of wavelengths between 400 and 700 nm.

The data from the sensors are sent to the Communication Module in the mobile stand and then transmitted to a data server. The stored data is analyzed by a growth model specially developed for grass. The model shows the current condition of the grass, the growth forecast and the actions needed to optimise the grass quality.

The humidity sensors monitor when and how much water the grass needs. The PAR and temperature sensors determine if artificial light should be provided. Physically, economically and environmentally, it is important to only provide artificial light when the grass needs it.

The Grass Analyser is part of the SGL Concept, a revolutionary grass growing technique that is used in more than 30 stadiums across the world; in Australia, Germany, Greece, Ireland, The Netherlands, Russia, Spain and the United Kingdom.

Hopefully, the best quality grass will lead to more entertaining soccer matches being played!

About Grow®

Innovative technical solutions to improve convenience and efficiency, and provide higher profit. That's what Grow® offers in its main business area of greenhouse horticulture automation. Grow® exploits its experience in sensor technology to continuously develop new products and solutions.

This experience and knowledge, together with the high quality of Kipp & Zonen sensors, results in a successful partnership. For more information go to www.grow-init.com ■

The team of Grow®

New Members to the US Team

Kipp & Zonen is pleased to announce that Rodney Esposito and Victor Cassella have joined us as the Sales and Marketing team for our New York office, with the objective of taking our business in the United States to the next level.

Rodney Esposito was previously employed by Sulzer Metco in Westbury, New York as a Key Account Manager. Mr. Esposito received his Bachelor of Science degree in Electrical Engineering from New York Institute of Technology in Old Westbury, New York. Since 1989, Rodney has worked within the Industrial Markets with expertise in the aircraft, automotive, and medical industries. Kipp & Zonen is excited to introduce Mr. Esposito as the Sales and Marketing Manager for the Industrial Markets.

Victor Cassella worked for the Department of Energy's Brookhaven National Laboratory (BNL) in Upton, New York. Mr. Cassella has held the position of Lead Meteorologist/Climatologist at BNL since 1990. Victor received his Atmospheric Science degree from the State University of New York at Albany in 1990. In 2002, Victor continued his education and completed his Masters in Business Administration at Dowling College in Oakdale, Long Island, New York. Mr. Cassella brings his knowledge of weather monitoring systems to Kipp & Zonen and will be the Sales and Marketing Manager for the Scientific Markets.

Mr. Esposito and Mr. Cassella have undergone company familiarization and product training at the Kipp & Zonen headquarters in Delft, the Netherlands and can offer full support services to our American customers from our office in Bohemia. In addition to a local inventory of our biggest selling products, many of our instruments can be repaired and calibrated to factory standards, without the need to ship them back to the Netherlands ■

Victor Cassella
Sales and Marketing Manager
Scientific Markets
T: +1 (0) 631 589 2065 ext 22
F: +1 (0) 631 589 2068
M:+1 (0) 631 245 5516
victor.cassella@kippzonen.com

Rodney Esposito
Sales and Marketing Manager
Industrial Markets
T: +1 (0) 631 589 2065 ext 38
F: +1 (0) 631 589 8795
M:+1 (0) 631 786 1558
rodney.esposito@kippzonen.com

A New Type of Optical Rain Sensor

Mierij Meteo designs and builds high quality systems for measuring meteorological phenomena and is mostly know for their wind sensors. Another discipline at Mierij Meteo is precipitation detection. The Mierij Meteo model 205 optical rain sensor uses a new principle of precipitation detection. The sensor is solid state and designed for a long operating life.

The 205 has a number of near infrared transmitters and a near infrared receiver. Only dynamic changes on the glass surface of the sensor caused by rain are detected; so it is not sensitive to dust, dirt or other pollution. The sensor is normally mounted at an angle of 30° so that precipitation does not build up on the surface.

There is an industry standard 4 – 20 mA output signal. No precipitation is equal to 4 mA and precipitation is equal to 20 mA. An open collector output is also provided, which switches to ground when precipitation is detected. A heater is built in to prevent due formation and ensures a fast recovery time at the end of a precipitation period.

Almost 350 of these rain sensors are installed and operating in the Netherlands Ice Warning System network for road safety monitoring. Other applications for the 205 are in greenhouses, building automation and process control systems for industry.

Model 205 Advantages

- Long life
- Small size
- Not sensitive to dust or dirt
- Heater included (inside sensor)
- Fast response and recovery time
- 4 - 20 mA and open collector outputs

Fairs & Events

EMS - Amsterdam - The Netherlands	29 Sept - 3 Oct '08
Hortifair - Amsterdam - The Netherlands	14 - 17 Oct '08
TECO-METEOREX - St. Petersburg - Russia	27 - 29 Nov '08
AGU - San Francisco - USA	15 - 19 Dec '08

Passion for precision

Kipp & Zonen is the worldwide authority in measuring solar radiation and atmospheric properties. Our passion for precision has led to the development of a large range of high quality instruments: from all weather radiometers to complete measurement networks.

We promise our customers guaranteed performance and quality in various markets: Meteorology, Climatology, Hydrology, Industry, Renewable Energy, Agriculture and Public Health & Safety. We hope you will join our passion for precision.

HEAD OFFICE

Kipp & Zonen B.V.
Delftechpark 36, 2628 XH Delft
P.O. Box 507, 2600 AM Delft
The Netherlands

T: +31 (0) 15 2755 210
F: +31 (0) 15 2620 351
info@kippzonen.com

SALES OFFICES

Kipp & Zonen France S.A.R.L.
7 Avenue Clément Ader
ZA Ponroy - Bâtiment M
94420 Le Plessis Trévise
France

T: +33 (0) 1 49 62 41 04
F: +33 (0) 1 49 62 41 02
kipp.france@kippzonen.com

Kipp & Zonen Asia Pacific Pte. Ltd.
583 Orchard Road
16-01 Forum Building
Singapore 238884

T: +65 (0) 6735 5033
F: +65 (0) 6735 8019
kipp.singapore@kippzonen.com

Kipp & Zonen U.K. Ltd.
P.O. Box 819,
Lincoln, Lincolnshire
LN6 OWY
United Kingdom

T: +44 (0) 1522 695 403
F: +44 (0) 1522 696 598
kipp.uk@kippzonen.com

Kipp & Zonen USA Inc.
125 Wilbur Place
Bohemia
NY 11716
United States of America

T: +1 (0) 631 589 2065
F: +1 (0) 631 589 2068
kipp.usa@kippzonen.com

Go to www.kippzonen.com for your local distributor or contact your local sales office

KIPP & ZONEN
SINCE 1830

4414105-0809